HOWRAH FOUNDRY CLUSTER

Promoting energy efficient divided blast cupola (DBC)

Tags	
Sub-sector:	Foundry
Location:	Howrah
Partners:	SDC, TERI, Cast Metals Development Limited, M B Associates, Sorane SA
Year:	1994–2011

Background

There are about 5000 small-scale foundry units in India, with a collective annual output of about six million tonnes of castings which are marketed both in India and abroad. The foundry industry provides direct employment to an estimated 500,000 people.

The Howrah foundry cluster is one of the oldest and largest foundry clusters in India. There are about 300 foundries operating in the cluster that mainly produce low-value-added castings such as manhole covers and pipes. Many of the foundry units still use poorly designed melting systems and sub-optimal operating practices.

Context

The foundry sector is among the most energy intensive MSME sectors in India, consuming around 600,000 tonnes of coke per year (equivalent to around 1,640,000 tonnes CO2). Melting is by far the most energy intensive stage of a foundry's operations. Recognizing the potential to increase the energy efficiency of the conventional coke-based cupolas and thereby reduce CO2 emissions, SDC partnered with TERI in a project to demonstrate and promote a more energy-efficient cupola for small-scale foundries in India. The Howrah foundry cluster was chosen for demonstration of the energy efficient melting technology. After considering various technological options, the project partners shortlisted 'Divided Blast Cupola' (DBC), developed by the British Cast Iron Research Association (BCIRA), UK, as the best option suitable for Indian foundries which would help in improving energy efficiency of the foundry sector at a modest investment.

Intervention

The demonstration unit in Howrah, Bharat Engineering Works, was selected in consultation with the local industry association, i.e. Indian Foundry Association (IFA). In setting up the DBC demonstration plant, the project adopted a 'competence pooling' approach, i.e. it brought together local and international experts in many disciplines like project management, foundry technology, energy management, cupola operations, and environmental technology. Cast Metals

Development Limited, U.K., a BCIRA group company and consultants from M B Associates and Sorane SA provided crucial support and expertise in transferring technical know-how related to the DBC, and at every stage during the design and commissioning the demonstration plant. The DBC was successfully demonstrated in July 1998.

Results

The demonstrated DBC yielded an energy savings of about 40% compared to the conventional cupola. The DBC system paid back its capital investment in less than two years.

Key features of energy efficeint DBC
Reduces coke consumption by about 25–65% compared to conventional cupola
Increases molten metal tapping temperature by about 50 °C
Increases the melting rate
Reduces silicon and manganese losses in the metal

Demonstration unit at Howrah

In order to ensure the sustained uptake of the energy efficient DBC technology in the Howrah cluster, the project identified technically capable local service providers (LSPs) who could generate awareness on and provide technical backup support for adoption of the TERI-designed DBC technology by other foundry units. Thanks to the LSPs' sustained efforts, around 23 DBC replications have taken place in the Howrah cluster till June 2011; these have exhibited consistent energy savings.

Key lessons

The Howrah experience illustrates the vital role played by LSPs in ensuring the sustained uptake of energy efficient technology in an MSME cluster. While the demonstration unit helped showcase the benefits of the energy efficient DBC technology, other foundry units in Howrah were initially cautious about adopting the new technology—primarily because of its relatively high capital cost, coupled with uncertainty about the availability of necessary technical support services at cluster level in the long term. The LSPs identified and supported by TERI were technically adept persons already familiar to foundry entrepreneurs and other stakeholders in Howrah. The LSPs were also sensitive to the cluster dynamics —in particular, they were aware of the differing profiles, priorities and technological requirements of different foundry entrepreneurs. In essence, the LSPs commanded both credibility and trust among the local

industry, and this has enabled them to promote, support and sustain replications of the energy efficient DBC in the Howrah cluster.